



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,999	07/17/2003	Yousheng Shen	011361.00064	2626
22910 7590 06/14/2010 BANNER & WITCOFF, LTD. 28 STATE STREET SUITE 1800 BOSTON, MA 02109-1701				
EXAMINER				
OLSEN, KAJ K				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
06/14/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/621,999

**Applicant(s)**

SHEN ET AL.

**Examiner**

KAJ K. OLSEN

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2, 17-74, 76-108, 110, 112 and 113 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 30-74 and 76-78 is/are allowed.
- 6) ☒ Claim(s) 17, 79-108, 110, 112 and 113 is/are rejected.
- 7) ☐ Claim(s) 2 and 18-29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-848)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Reissue Applications***

1. The examiner has withdrawn the outstanding rejections under 35 U.S.C. 251 in view of the amendments to the claims. The examiner has also withdrawn the outstanding objection under 37 CFR 1.173(b) concerning the form of the amendment to claims 2, 17, 18, 27, 30, 47, and 59.

### ***Res Judicata***

2. Claims 95 and 96 of this reissue are identical to claims 79 and 80 presented to the Board of Patent Appeals and Interferences in Reexamination 90/006,208 except that applicant has now incorporated the limitations of claim 109 into claim 95. Claim 109 would appear to be identical to claim 14 from the original reexamination of 90/006,208 except that claim 14 depended from claim 1 and not claim 79 in the original reexamination. However, claims 1 and 79 in the reexamination were identical except that claim 79 specified that the gas in question was carbon monoxide. Claim 8 in the reexamination further limited claim 1 by specifying that the gas being analyzed was carbon monoxide. Hence, amended claim 95 here would appear to be equivalent to the combination of claims 1, 8, and 14 from the reexamination. The examiner was affirmed in the Board decision of 5/23/2007 concerning claims 1, 8, 14, and the pre-amended claim 79. Claim 96 is still equivalent to claim 80 from the previous reexamination. The examiner was affirmed on his rejections of claims 1, 8, 14, previous claim 79, and 80, so there are no limitation in amended claim 79 that the Board has not previously considered. Hence, these claims 95 and

Art Unit: 1795

96 are rejected on the grounds of *res judicata* and the applicant is not entitled to further adjudication of the issues concerning these claims.

***Oath/Declaration***

3. The newly submitted declaration of 4/2/2010 overcomes all the objections to the previous declaration.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 17 depends from claim 109 that the applicant has now canceled. Because the limitations of claim 109 were incorporated into claim 82, the examiner will presume that claim 17 should now depend from claim 82, but clarification is required.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 79, 81, 86, 88, and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey et al (USP 4,227,984) in view of Nagata et al (USP 4,913,792) and any of Vanderborgh et al (USP 4,804,592), Uchida et al (USP 5,474,857) and/or Grot et al (USP 5,330,860).

10. With respect to claim 79, Dempsey discloses an electrochemical gas sensor that comprises a sensing electrode 13, a counter electrode 10, with a protonic conductive electrolyte membrane 9 between and in contact with both the sensing and counter electrodes (fig. 2). Dempsey teaches the use of a membrane with a thickness that reads on the claimed thickness (col. 11, lines 58-60). The sensing electrode reacts with the gas to be measured and the sensor has a means for electrical measurement (fig. 3). With respect to the area of the electrodes, see col. 11, lines 65-67. 1.6 cm would read on "approximately...15 mm" giving the claim language its broadest reasonable interpretation. Dempsey does not explicitly teach the use of sensing and counter electrodes that contain both ionically and electrically conductive materials. Dempsey does recognize that the electrodes set forth in the fuel cell prior art find utility for the sensor of Dempsey (col. 8, lines 30-63). In the fuel cell art, it is common to utilize a combination of ionically and electrically conductive material for the electrodes for fuel cells. In particular,

Vanderborgh and Grot teach the use of a combination of said materials and teaches that said combination of materials provides a fuel cell with improved efficiency and internal resistance (col. 2, lines 42 and 43 of Vanderborgh and col. 4, lines 26-29 of Grot). Uchida teaches a particular electrode for use in fuel cells that is a combination of proton conducting material and electrically conducting material. Grot also teaches the use of fuel cell electrodes having both ionically and electrically conductive materials that also satisfy the claimed compositions (col. 4, line 35 through col. 5, line 2; and col. 14, lines 15-27). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of any of Vanderborgh, Uchida, and/or Grot for the sensor of Dempsey because these electrodes have shown previous favorable utility in the fuel cell art, and the substitution of one known fuel cell electrode composition for another, when the results are not unexpected, requires only routine skill in the art. Furthermore, the addition of ionically conductive material to the electrode would improve the effective resistance of the electrodes as well as facilitate the removal of the solid-solid interfaces between the electrodes and the membrane (Vanderborgh, col. 2, lines 25-43). Although the secondary references are drawn principally towards fuel cell power sources, Uchida and Grot both recognized the utility of their teachings to fuel cell based sensors like those of Dempsey (see Uchida, col. 10, lines 60-64; and Grot, col. 1, lines 19-30). In addition, Dempsey recognized the utility of the teachings from the general fuel cell art for the disclosed sensor (col. 8, lines 30-63).

11. Dempsey also did not teach that the sensing and counter electrodes are the only two electrodes in contact with the first protonic conductive electrolyte membrane. Rather Dempsey taught the addition of a third reference electrode 32 that is also in contact with the membrane.

However, Nagata teaches that it is not necessary to utilize a reference electrode to stabilize the potential of the working electrode as long as the counter electrode is large enough to help maintain a stable potential at the working electrode. Nagata also teaches that such a two-electrode cell simplifies the circuitry as it obviates the need for a potentiostat to control the potential of the working electrode. Compare fig. 1 with fig. 8 and see col. 7, l. 66 - col. 8, l. 11. Because Nagata teaches that both two and three electrode gas sensors were known in the art and that sensors were readily transferable between the two, and further taught that two-electrode sensors have simplified circuitry, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize only two-electrodes for the sensor of Dempsey in view of Vanderborgh, Uchida, and/or Grot as taught by Nagata because the substitution of one known sensor structure (two-electrode) for another known structure (three-electrode) requires only routine skill in the art. In addition, the use of a two-electrode configuration has the added advantage of being simpler to construct and operate.

12. With respect to claim 81 (those limitations not covered above), because the electrode of Dempsey in view of Vanderborgh, Uchida, and/or Grot already rendered obvious the combination of catalytic electronic conducting material (e.g. Pt) and ion conducting material (e.g. Nafion) for the electrodes with overlapping composition to the electrodes of the instant invention, then such an electrode would inherently be capable of reacting with a gas in the absence of an applied voltage to the sensing electrode. The fact that Dempsey operates its sensor using an applied voltage to the sensing electrode does not read free of this limitation because whether or not a voltage is applied is how the sensor is to be utilized and does not further define the structure of the device.

13. With respect to claims 86 and 88 (those limitations not covered above), whether or not the sensor is operated at room temperature is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. It is noted however that the sensor of Dempsey can be utilized at room temperature as evidenced by col. 2, ll. 30-35.

14. With respect to new claim 97, this claim appears to comprise almost entirely limitations already addressed previously. With respect to the use of the specified copolymer of tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing a sulfonic group, each of Vanderborgh, Uchida, and Grot specify the use of Nafion as the polymer being mixed with the electrode material (see the discussion above) and Nafion is inherently a copolymer of tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing a sulfonic group. See the present invention specification col. 6, ll. 40-46. With respect to the specified thickness of 0.17 mm for the membrane, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a thinner membrane than that set forth by Dempsey in order to further reduce the internal resistance of the sensor. With respect to approximately 0.17 mm, finding the optimal thickness requires only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). With respect to the specific use of 15 mm for the sensing electrode, this is so close to the 16 mm of Dempsey that it constitutes an obvious difference over the area relied on by Dempsey. There is no particular criticality disclosed by the present invention for the specific use of 15 mm, nor is there any criticality to the use of 16 mm by the teaching of Dempsey. Both the thickness and diameter positions were affirmed in the Appeal decision of 90/006,208.



15. Claims 17, 79-101, 103-106, 108, 110, 112, and 113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomantschger et al (USP 5,173,166) (hereafter “Tomantschger ‘166”) in view of Dempsey and any or Vanderborgh, Uchida, and/or Grot.

16. With respect to claim 79, Tomantschger ‘166 discloses a two-electrode electrochemical gas sensor for measuring a gas in an ambient atmosphere (col. 5, ll. 27-32) comprising a porous sensing electrode 12 containing electronically conducting material, a porous counter electrode 16 also containing electronically conducting material (col. 8, ll. 13-20 and examples 1-5 of col. 12), and a first protonic conductive electrolyte membrane 24 (col. 6, ll. 61-63) in between and in contact with the sensing and counter electrodes where the sensing and counter electrodes are the only two electrodes in contact with the membrane (fig. 3 for example). Tomantschger ‘166 discloses that the sensing electrode reacts with the gas to produce a change in electrical characteristic (either a potential or a current) between the sensing electrode and counter electrode (col. 7, ll. 21-33), whereby in a positive ambient concentration of said gas, said electrical measurement detects changes in said electrical characteristics (fig. 6 and 7). Tomantschger ‘166 does not explicitly disclose the addition of an ionically conducting material to the electrodes of the sensor. However, it is noted that Tomantschger ‘166 admits that its sensor is essentially functioning as a fuel cell device. See col. 8, ll. 23-28. In the fuel cell art, it is common to utilize a combination of ionically and electrically conductive material for the electrodes for fuel cells. In particular, Vanderborgh and Grot teach the use of a combination of said materials and teaches that said combination of materials provides a fuel cell with improved efficiency and internal resistance (col. 2, lines 42 and 43 of Vanderborgh and col. 4, lines 26-29 of Grot). Uchida teaches a particular electrode for use in fuel cells that is a combination of proton conducting

material and electrically conducting material. Grot also teaches the use of fuel cell electrodes having both ionically and electrically conductive materials that also satisfy the claimed compositions (col. 4, line 35 through col. 5, line 2; and col. 14, lines 15-27). Vanderborgh teaches the use of 19 wt% Nafion to 81 wt% of the total C and Pt concentration (see Table 1); Uchida teaches the use of 13 wt% Nafion (col. 7, l. 63 - col. 8, l. 26); and Grot teaches the use of 0-25 wt% Nafion (col. 4, ll. 44-55). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of any of Vanderborgh, Uchida, and/or Grot for the electrodes of Tomantschger '166 for the sensor of Tomantschger '166 because these electrodes have shown previous favorable utility in the fuel cell art, and the substitution of one known fuel cell electrode composition for another, when the results are not unexpected, requires only routine skill in the art. Furthermore, the addition of ionically conductive material to the electrode of Tomantschger '166 would improve the effective resistance of the electrodes as well as facilitate the removal of the solid-solid interfaces between the electrodes and the membrane (Vanderborgh, col. 2, lines 25-43). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to add ionically conducting material to the electronically conducting electrodes of Tomanstschger in order to increase the electrode efficiency and reduce its resistance. Uchida and Grot both recognized the utility of their teachings to fuel cell based sensors like those of Tomantschger '166 (see Uchida, col. 10, lines 60-64; and Grot, col. 1, lines 19-30).

17. Tomantschger '166 also did not explicitly disclose either a particular diameter for its electrodes or a particular thickness of protonic conductive electrolyte membrane. However, the previously relied on Dempsey taught for a different CO sensor that electrodes having a diameter

of 16 mm with a Nafion membrane having a thickness overlapping the claimed range provided suitable dimensions for the electrodes and membrane. See col. 11, ll. 58-68. The examiner takes the position that 16 mm either reads on “approximately 1 mm to 15 mm” or is so close to 1-15 mm as to not constitute a patentable distinction. This position was affirmed in the appeal decision for Reexamination 90/006,208 dated 5/23/2007. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the electrode and electrolyte dimensions from Dempsey for the electrodes and electrolyte of Tomantschger ‘166 because these dimensions have been previously shown to provide effective CO sensitivity. Because Tomantschger ‘166 did not explicitly disclose any dimensions of electrode diameter or electrolyte thickness, this would lead one possessing ordinary skill in the art to conclude that electrode area and membrane thickness were not critical to the sensor of Tomantschger ‘166 and would have thought to utilize dimensions disclosed from previous successful CO monitors for the construction of the sensor disclosed by Tomantschger ‘166. The teaching of Dempsey was already identified by Tomantschger ‘166 as being an effective prior art sensor. See Tomantschger ‘166, col. 3, ll. 15-20.

18. With respect to claim 80 (those limitations not covered above), the sensing electrode of Tomantschger ‘166 produces an electrical change in the absence of any applied voltage. See col. 7, ll. 26-33.

19. With respect to claim 81, see the discussion of claims 79 and 80 above.

20. With respect to claims 82-85 (those limitations not covered above), the sensing and counter electrodes are on opposite sides of the protonic conductive electrolyte membrane (see fig. 3).

21. With respect to claim 17, Tomantschger '166 describes electrodes formed from noble metals in combination with carbon or graphite (col. 6, ll. 28-33), and ruthenium (Ru) is a noble metal. Further Grot identifies ruthenium and reduced oxides thereof as a suitable catalytic material that may be used with a carbon black support, such as that sold under the VULCAN trade designation (col. 4, ll. 56-61). One of ordinary skill in the art would have been motivated to form an electrode having the claimed percentages of ruthenium oxide and carbon black as Tomantschger '166 describes electrodes formed from noble metals and as Grot and Uchida teach that suitable electrodes for gas sensing applications may be formed having the claimed percentages of noble metals, such as ruthenium oxide, and carbon.
22. With respect to claims 86-91 (those limitations not discussed above), Tomantschger '166 operates its sensor at room temperature. See col. 5, ll. 27-32.
23. With respect to claims 92-94 (those limitations not covered above), Tomantschger '166 is a non-biased device as they apply no biasing potential to the electrodes.
24. With respect to new claim 95, see the rejection of claim 80 above and note that Tomantschger '166 already suggested the measurement of carbon monoxide (fig. 6 and 7).
25. With respect to claim 96, element 14 of Tomantschger '166 reads on the defined cap of the claims.
26. With respect to claim 97, see the discussion of the previous claims above where most of these limitations were previously covered. With respect to the use of the specified copolymer of tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing a sulfonic group, each of Vanderborgh, Uchida, and Grot specify the use of Nafion as the polymer being mixed with the electrode material (see the discussion above) and Nafion is inherently a

copolymer of tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing a sulfonic group. See the present invention specification col. 6, ll. 40-46. With respect to the specified thickness of 0.17 mm for the membrane, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a thinner membrane than that set forth by Dempsey in order to further reduce the internal resistance of the sensor. With respect to approximately 0.17 mm, finding the optimal thickness requires only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). With respect to the specific use of 15 mm for the sensing electrode, this is so close to the 16 mm of Dempsey that it constitutes an obvious difference over the area relied on by Dempsey. There is no particular criticality disclosed by the present invention for the specific use of 15 mm, nor is there any criticality to the use of 16 mm by the teaching of Dempsey. Both the thickness and diameter positions were affirmed in the Appeal decision of 90/006,208.

27. With respect to claims 98 and 99, see Tomantschger '166 col. 12, ll. 10-55; Dempsey col. 7, ll. 65-68; Uchida col. 7, l. 55 - col. 8, l. 26; Grot col. 4, l. 35 - col. 5, l. 2 and col. 14, ll. 15-27; and Vanderborgh, table 1.

28. With respect to claim 100, see Dempsey col. 8, ll. 1-29.

29. With respect to claim 101, see Tomantschger '166 col. 11, ll. 3-6

30. With respect to claims 103-106, see Tomantschger '166 claim 20 of the Dempsey abstract.

31. With respect to claim 108 (those limitations not covered above), it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize

smaller electrodes for the sensor of Tomantschger in order to make a more compact sensor that utilizes lesser amounts of expensive materials like platinum.

32. With respect to claims 110, 112, and 113, see the discussion of Vanderborgh, Uchida, and Grot above.

33. Claims 17, 80, 82, 84, 87, 89, 91, 92, 95, 96, 98-101, 103, 104, 108, 110, 112, and 113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey in view of any of Vanderborgh, Uchida and/or Grot.

34. With respect to claim 80, Dempsey discloses an electrochemical gas sensor that comprises a sensing electrode 13, a counter electrode 10, with a protonic conductive electrolyte membrane 9 between and in contact with both the sensing and counter electrodes (fig. 2). Dempsey teaches the use of a membrane with a thickness that reads on the claimed thickness (col. 11, lines 58-60). The sensing electrode reacts with the gas to be measured and the sensor has a means for electrical measurement (fig. 3). With respect to the area of the electrodes, see col. 11, lines 65-67. 1.6 cm would read on “approximately...15 mm” giving the claim language its broadest reasonable interpretation. Dempsey does not explicitly teach the use of sensing and counter electrodes that contain both ionically and electrically conductive materials. Dempsey does recognize that the electrodes set forth in the fuel cell prior art find utility for the sensor of Dempsey (col. 8, lines 30-63). In the fuel cell art, it is common to utilize a combination of ionically and electrically conductive material for the electrodes for fuel cells. In particular, Vanderborgh and Grot teach the use of a combination of said materials and teaches that said combination of materials provides a fuel cell with improved efficiency and internal resistance (col. 2, lines 42 and 43 of Vanderborgh and col. 4, lines 26-29 of Grot). Uchida teaches a

particular electrode for use in fuel cells that is a combination of proton conducting material and electrically conducting material. Grot also teaches the use of fuel cell electrodes having both ionically and electrically conductive materials that also satisfy the claimed compositions (col. 4, line 35 through col. 5, line 2; and col. 14, lines 15-27). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of any of Vanderborgh, Uchida, and/or Grot for the sensor of Dempsey because these electrodes have shown previous favorable utility in the fuel cell art, and the substitution of one known fuel cell electrode composition for another, when the results are not unexpected, requires only routine skill in the art. Furthermore, the addition of ionically conductive material to the electrode would improve the effective resistance of the electrodes as well as facilitate the removal of the solid-solid interfaces between the electrodes and the membrane (Vanderborgh, col. 2, lines 25-43). Although the secondary references are drawn principally towards fuel cell power sources, Uchida and Grot both recognized the utility of their teachings to fuel cell based sensors like those of Dempsey (see Uchida, col. 10, lines 60-64; and Grot, col. 1, lines 19-30). In addition, Dempsey recognized the utility of the teachings from the general fuel cell art for the disclosed sensor (col. 8, lines 30-63). With respect to the limitation concerning the sensing electrode reacting with the gas in the absence of an applied voltage, because the electrode of Dempsey in view of Vanderborgh, Uchida, and/or Grot already rendered obvious the combination of catalytic electronic conducting material (e.g. Pt) and ion conducting material (e.g. Nafion) for the electrodes with overlapping composition to the electrodes of the instant invention, then such an electrode would inherently be capable of reacting with a gas in the absence of an applied voltage to the sensing electrode. The fact that Dempsey operates its sensor using an applied voltage to

the sensing electrode does not read free of this limitation because whether or not a voltage is applied is how the sensor is to be utilized and does not further define the structure of the device.

35. With respect to claims 82 and 84 (those limitations not covered above), the sensing and counter electrodes (31, 33) of Dempsey are on opposite sides of the protonic conductive membrane. See fig. 3.

36. With respect to claim 17, Dempsey describes electrodes formed from noble metals and in particular platinum metals (col. 7, l. 65 – col. 8, l. 1) and ruthenium (Ru) is a platinum group metal and a noble metal. Further Grot identifies ruthenium and reduced oxides thereof as a suitable catalytic material that may be used with a carbon black support, such as that sold under the VULCAN trade designation (col. 4, ll. 56-61). One of ordinary skill in the art would have been motivated to form an electrode having the claimed percentages of ruthenium oxide and carbon black as Dempsey describes electrodes formed from noble metals and as Grot and Uchida teach that suitable electrodes for gas sensing applications may be formed having the claimed percentages of noble metals, such as ruthenium oxide, and carbon.

37. With respect to claims 87, 89, and 91 (those limitations not covered above) whether or not the sensor is operated at room temperature is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. It is noted however that the sensor of Dempsey can be utilized at room temperature as evidenced by col. 2, ll. 30-35.

38. With respect to claim 92, specifying that the sensor is non-biased in the preamble does not further define the structure of the sensor and merely constitutes the intended use of the



structure. Alternatively, the sensor of Dempsey would be non-biased when the potentiostat connected to the electrodes is either disconnected or turned off.

39. With respect to new claims 95, 96, 98-101, 103, 104, 108, 110, 112, and 113, see the rejection for claims 79, 80, 3-6, 8, 9, 13-16, and 75 over this same art from Reexamination 90/006,208. The examiner was affirmed in his rejection of those claims.

40. Claims 83, 85, 90, 93, and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey in view of any of Vanderborgh, Uchida, and/or Grot as applied to claims 82, 89, and 92 above, and further in view of Nagata.

41. The examiner notes that claim 94 was previously rejected over the teachings of Dempsey in view of any of Vanderborgh, Uchida, and/or Grot. However, the examiner noticed that claim 94 actually depends from claim 93 and not claim 92, so this claim is now being listed in this rejection. This change for claim 94 is not a change in the grounds of rejection, but merely a correction to reflect the appropriate claim dependence for claim 94.

42. With respect to claims 83, 90, 93, and 94 (those limitations not covered previously), the references set forth all the limitations of the claims, but did not specify that the sensing electrode and the counter electrode are the only two electrodes in contact with the electrolyte membrane. Rather Dempsey taught the addition of a third reference electrode 32 that is also in contact with the membrane. However, Nagata teaches that it is not necessary to utilize a reference electrode to stabilize the potential of the working electrode as long as the counter electrode is large enough to help maintain a stable potential at the working electrode. Nagata also teaches that such a two-electrode cell simplifies the circuitry as it obviates the need for a potentiostat to control the potential of the working electrode. Compare fig. 1 with fig. 8 and see col. 7, l. 66 - col. 8, l. 11.

Because Nagata teaches that both two and three electrode gas sensors were known in the art and that sensors were readily transferable between the two, and further taught that two-electrode sensors have simplified circuitry, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize only two-electrodes for the sensor of Dempsey in view of Vanderborgh, Uchida, and/or Grot as taught by Nagata because the substitution of one known sensor structure (two-electrode) for another known structure (three-electrode) requires only routine skill in the art. In addition, the use of a two-electrode configuration has the added advantage of being simpler to construct and operate.

43. With respect to claim 85, because the electrode of Dempsey in view of Vanderborgh, Uchida, and/or Grot already rendered obvious the combination of catalytic electronic conducting material (e.g. Pt) and ion conducting material (e.g. Nafion) for the electrodes with overlapping composition to the electrodes of the instant invention, then such an electrode would inherently be capable of reacting with a gas in the absence of an applied voltage to the sensing electrode. The fact that Dempsey operates its sensor using an applied voltage to the sensing electrode does not read free of this limitation because whether or not a voltage is applied is how the sensor is to be utilized and does not further define the structure of the device.

44. Claim 102 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey with any of Vanderborgh, Uchida, or Grot as applied to claim 82 above, and further in view of Tomantschger et al (USP 5,302,274) (hereafter "Tomantschger '274").

45. The references set forth all the limitations of the claims, but did not explicitly recite the use of a metal oxide protonic conductor electrolyte. Tomantschger '274 teaches in an alternate gas sensor a number of different electrolyte materials useable as for gas sensors including a

uranyl hydrogen phosphate tetrahydrate (col. 8, lines 37 and 38). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Tomantschger '274 for the sensor Dempsey in view of any of Vanderborgh, Grot or Uchida because the substitution of one known electrolyte means for another, when the results are not unexpected, requires only routine skill in the art.

46. Claim 102 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomantschger '166 in view of Dempsey and any or Vanderborgh, Uchida, and/or Grot as applied to claim 82 above, and further in view of Tomantschger '274.

47. The references set forth all the limitations of the claims, but did not explicitly recite the use of a metal oxide protonic conductor electrolyte. Tomantschger '274 teaches in an alternate gas sensor a number of different electrolyte materials useable as for gas sensors including a uranyl hydrogen phosphate tetrahydrate (col. 8, lines 37 and 38). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Tomantschger '274 for the sensor Tomantschger '166 in view of Dempsey and any of Vanderborgh, Grot or Uchida because the substitution of one known electrolyte means for another, when the results are not unexpected, requires only routine skill in the art.

48. Claims 105 and 106 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey in view of any of Vanderborgh, Uchida, or Grot as applied to claim 82 above, and further in view of La Conti.

49. The references set forth all the limitations of the claim, but did not specifically teach the sensor be "adapted" to detect hydrogen or H<sub>2</sub>S. La Conti teaches in an analogous sensor that these sensors can be adapted to the detection of materials such as hydrogen and H<sub>2</sub>S (see Table

1). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of La Conti for the sensor of Dempsey in order to extend the utility of the sensor to other gases.

50. Claim 107 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dempsey in view of any of Vanderborgh, Uchida, or Grot as applied to claim 82 above, and further in view of Razaq (USP 5,322,602).

The references set forth all the limitations of the claims, but do not explicitly teach the adapting the sensor for use as a water sensor. Razaq teaches that the sensors like those of Dempsey can also be adapted for use as a water sensor (see abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Razaq for the sensor of Dempsey in order to extend the utility of the sensor to other gases such as water.

51. Claim 107 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomantschger '166 in view of Dempsey and any of Vanderborgh, Uchida, and/or Grot as applied to claim 82 above, and further in view of Razaq.

52. The references set forth all the limitations of the claims, but do not explicitly teach the adapting the sensor for use as a water sensor. Razaq teaches that the sensors like those of Dempsey can also be adapted for use as a water sensor (see abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Razaq for the sensor of Tomantschger '166 in order to extend the utility of the sensor to other gases such as water.

***Allowable Subject Matter***

53. Claims 2 and 18-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
54. Claims 30-74 and 76-78 are allowed.
55. The examiner has indicated the reasons for allowable subject matter in these claims in the 3/20/2008 office action. The examiner had previously indicated that claim 17 also contained allowable subject matter. However, reviewing the Board decision in the 90/006,209 reexamination, the examiner discovered that the Board concluded that claim 13 in that prosecution did not contain allowable subject matter. Claim 17 of the present invention appears to be substantially identical to claim 13 in the 90/006,209 reexamination, so the examiner is now adding the Board rejection from the previous decision to this prosecution.

***Response to Arguments***

56. Applicant's arguments filed 4/2/2010 have been fully considered but they are not persuasive. Applicant challenges the examiner's use of *res judicata* as a ground for rejection of claims 95 and 96. In particular, applicant urges that *res judicata* is only to be invoked when the claims are the same, with the same evidence being applied in the same manner. First, it is unclear where applicant came to this conclusion that *res judicata* only applies in this narrow fact situation as MPEP 706.03(w) actually states that *res judicata* applies when the issues are drawn to the same claim, a patentably nondistinct claim, or a claim involving the same issue. Because claims 95 and 96 do not contain any limitations that were not previously analyzed by the Board

of Appeals in Reexamination 90/006,208 where the examiner was affirmed, the use of *res judicata* against claims 95 and 96 is wholly appropriate. Applicant also invokes *In re Craig* and *In re Kaghan* for support against the use of *res judicata*, but in these cases, the *only* issue left was the issue of *res judicata* (i.e. the art rejection had been withdrawn). That is not the case here as the rejections originally presented to the Board in the reexamination are still being presented here.

57. Applicant also urges that new evidence can be effective in overcoming an outstanding *res judicata* rejection (see *In re Herr* or *In re Russell*) and applicant has presented new evidence in the record here. Albeit correct that new evidence has been effective in overcoming a *res judicata* rejection, what applicant terms “new evidence” here is really nothing more than further arguments against the combination of references the examiner was already affirmed on. In *In re Herr*, the new evidence was a recitation of unexpected androgenic and anabolic activity that was previously *refused* consideration. In *In re Russell*, the new evidence was a showing that the particularly claimed range had unexpected properties not disclosed by the different prior art range. Furthermore, contrary to how MPEP 706.03(w) presents *In re Russell* as being drawn to the same claims, the claims were amended and the amended language “without requiring filtration” appears to be critical to the CCPA’s analysis of the evidence. By contrast, what the applicant is urging is “new evidence” here is essentially that applicant now has additional reasons that they believe Dempsey is not appropriately combinable with any of Vanderborgh, Uchida, or Grot. As MPEP 1214.01(I) states, prosecution cannot be reopened after an appeal decision except for the subject matter drawn to any new grounds of rejection. Hence, the examiner continues to maintain that if the applicant was unsatisfied with the original Board

decision concerning the subject matter of claims 95 and 96, applicant's proper recourse should have been to further appeal that decision and not further argue here why the originally affirmed combination of references are improper.

58. Furthermore, not only are these further arguments not persuasive (see below), these further arguments aren't exactly new either. In particular, one of the main arguments applicant is now contending is that it would not have been obvious to substitute a supposedly hydrophilic Nafion for the hydrophobic Teflon of Dempsey because Dempsey's electrode is in direct contact with aqueous electrolyte. However, in the 4/21/2003 appeal brief for 90/006,208, applicant already discussed how they believe it wouldn't have been obvious to one of ordinary skill in the art to go from catalytic particles bonded to hydrophobic polymers of Dempsey to the catalytic particles bonding to ionic conducting materials like those of Grot, Uchida, or Vanderborgh because the electrode of Dempsey is in direct contact with an aqueous electrolyte (see pp. 36-38 of the appeal brief). Hence, applicant's "new evidence" is at best a further fleshing out of a previous unsuccessful line of arguments attempted in the earlier reexamination.

59. With regard to the rejection of Dempsey in view of Grot, Vanderborgh, or Uchida, applicant urges that Dempsey teaches the flooding of its electrolyte to provide self-humidification of the Nafion membrane so that the membrane will not dry out. Applicant further urges that the electrodes of Dempsey are made hydrophobic so that they will not drown the electrodes. Applicant then jumps to the non-relied on teaching of Surampudi to supposedly show that Nafion containing electrode will inherently allow the liquid to wet the pores of the electrode and will cause the electrodes to be ineffective. This train of argument by the applicant is unpersuasive for a number of reasons.

60. First, applicant side steps what Grot, Vanderborgh, and Uchida actually suggests and instead relies on Surampudi. When one actually compares the electrodes constructed by Surampudi with those of Grot, Vanderborgh, or Uchida, it immediately becomes apparent that applicant's reliance on Surampudi is misplaced. In particular, Surampudi teaches that its Nafion impregnated electrodes utilize no hydrophobic treatment (col. 13, ll. 46-57). Contrast this with Uchida which teaches the use of a water repelling treatment for the electrodes (col. 4, ll. 1-11). See also Vanderborgh, col. 10, l. 58 – col. 11, l. 1 where the electrode containing the solid polymer electrolyte is hydrophobically treated to control the wetting of the electrode. Finally, Grot teaches that the binder for the electrode can contain materials such as hydrophobic polytetrafluoroethylene (i.e. Teflon) and also suggests the use of surfactants (col. 5, ll. 63-68) presumably also to control the wetting ability of the electrode. Hence, two of the three secondary teachings already suggest that the hydrophobic character of the electrodes can still be controlled even though the electrodes contain Nafion, and all three of the actually relied on secondary teachings suggest the use of further hydrophobic treatment. Hence, it is unclear how Surampudi is relevant to the present issues when Surampudi didn't disclose the use of any wetting treatments and when none of the secondary teachings considered the switch from Teflon to Nafion to be detrimental to the electrode function. Furthermore, Cisar et al (USP 5,635,039) evidences that Nafion containing electrodes are not inherently plagued with flooding provided one choose the sulfonic group content of the Nafion appropriately (col. 8, ll. 44-65). That is, the hydrophobic or hydrophilic character of the Nafion is going to be a function of the ratio of the hydrophobic perfluorinated polymer backbone to the hydrophilic sulfonic group concentration (a point the applicant seems to acknowledge (p. 34 of the arguments)), and Nafion having higher



backbone to sulfonic ratios will be more hydrophobic. Hence, Surampudi's conclusion that a material like Nafion cannot be added to an electrode in too great an amount or the material data sheet stating that Nafion 117 is hygroscopic doesn't in and of itself indicate anything, because the wetting properties of Nafion can be tailored to the particular application. Although examples of Nafion being hygroscopic are known in the art doesn't mean that all Nafion is hygroscopic with some Nafion having a high degree of hydrophobic character. This much is echoed by Vanderborgh which states that the wetting properties for ion exchange polymers (like Nafion) are a function of the composition for the polymer (col. 2, ll. 57-61). Hence, applicant's suggestion that one cannot go from the use of Teflon to Nafion without rendering the electrode undesirably hydrophilic is contradicted by essentially all the secondary teachings as well as the new evidentiary teaching of Cisar. Those of ordinary skill in the fuel cell art (where Dempsey derived its electrodes from) were well aware of how to utilize Nafion in an electrode without making the electrode either hydrophilic or necessarily subject to flooding.

61. Second, although applicant spends a great deal of time discussing why one wouldn't utilize supposedly hygroscopic Nafion in an electrode for a device like Dempsey, the examiner notes that except for a few claims, the claims aren't even drawn to the use of Nafion, let alone a particularly hygroscopic form of Nafion, but rather a broadly defined "proton-electron mixed conductive material". The specification states that Nafion is only the preferred material for the electrode (col. 6, ll. 40-46). Applicant even has claims drawn to alternate forms of electrolyte (claim 102). Hence, even if the Nafion utilized by Surampudi or the Nafion 117 evidenced by applicant were too hydrophilic to be utilized for a flooded SPE membrane as applicant urges, then one possessing would have utilized a less hydrophilic form of proton-electron mixed conductive

Art Unit: 1795

material as the electrolyte (e.g. a more hydrophobic form of Nafion or one of the more hydrophobic materials that Tomantschger '274 (see the rejection of claim 102 above)) in order to tailor the electrode to have the desired level of hydrophobic character. See for example col. 2, ll. 57-61 of Vanderborgh which admitted that different electrolytes have different wetting properties.

62. Third, although applicant discusses Dempsey's use of flooding in great detail, one possessing ordinary skill in the art would have recognized that there are other means for self-humidifying a polymer electrolyte that don't involve the use of flooding. See for example the discussion of LaConti et al (USP 4,820,386) and claims 4, 56, 81, and 116 in the prosecution of reissue application 10/621,637. The examiner notes that the inventorship of LaConti overlaps that of Dempsey, post dates Dempsey, and teaches that the self-humidifying can be accomplished either with flooding (like the previous Dempsey) or simply with water vapor (col. 11, ll. 42-53). If the flooding of Dempsey is not necessary because there are other means of self-humidifying (as LaConti suggests), then this use of flooding by Dempsey is not necessary, and applicant's whole argument construct that Nafion containing electrodes can not be utilized with flooded electrodes is irrelevant. This use of a water source with water vapor permeable membrane of LaConti parallels the same structure disclosed in Shen et al USP 5,560,054 (i.e. reissue application 10/621,637). Shen does not give any evidence that water vapor humidified sensors having electrolyte containing electrodes are subject to undesirable flooding of the electrodes.

63. Applicant also urges that Uchida does not teach the use of 10-50% proton conductor material as required by the claim. In particular, applicant urges that the discussion of solid

polymer added at col. 8 is a separate coating placed over the catalyst layer and wouldn't be a proton-electron mixed conductive material. This is wholly unpersuasive. First, it appears that the applicant is somehow reading the claimed "proton-electron mixed conductive material" as somehow requiring proton conductive material and electron conductive material mixed together and separate layers of proton conductive material and electron conductive material of Uchida wouldn't read on the claim. However, the claims never state that the proton conductive material and the electron conductive material must be mixed together, but instead that the material relied on for the electrode must be "*mixed conductive material*" (emphasis added) or a material possessing both proton and electron conduction. In other words, the "mixed" is further modifying the term "conductive" and not "material". If Uchida reads on the mixed conductive material, it meets the claim regardless of whether or not it also reads on a mixture of materials. Second, this interpretation of the claim aside, the examiner doesn't believe Uchida's use of a separate coating step for the Nafion would read away from latter interpretation of mixture of material either. In particular, the catalyst layer of Uchida is porous and the polymer electrolyte is allowed to impregnate the porous catalyst layer. See fig. 2 and 3 and col. 4, l. 63 – col. 5, l. 11. The result of such an impregnation would not be a separate layer of Nafion over the conductive electrode, but a single layer comprising a mixture of proton conductive material and electron conductive material (see fig. 2 and 3 where the Nafion 11 is integrated into the electron conductive material 53). Uchida would still anticipate this particular limitation of the claim.

64. Applicant urges that Vanderborgh is not relevant because its electrode comprises three distinct layers and three distinct layers cannot be construed as being a material. It is unclear how applicant came to the conclusion that a broadly defined "material" cannot comprise a device

made of multiple layers operating in tandem. In particular, if a mixture of two different materials can be construed as being a singular “material” as would be necessary for interpreting the present claims in view of the specification, then it is unclear why an electrode constructed of three separate layers cannot also be construed as being an electrode material either. These layers all combined to provide the electrode functionality and have the property of combining proton and electron mixed conducting.

65. Applicant particular argument concerning Grot appears to rely on the same analysis of Surampudi already discussed above. Those arguments were unpersuasive for the reasons discussed above.

66. With respect to the rejections relying on Nagata, applicant urges that if Dempsey didn't utilize a reference electrode, then the sensor wouldn't be a potentiostated sensor anymore. Whether or not this is the case, the examiner fails to see the relevance of this point. The purpose of Nagata was to show that those possessing ordinary skill in the gas sensor art recognized that sensors can be constructed both with and without reference electrodes and discussed the advantages of not utilizing a reference electrode. Applicant's whole argument appears to be that because Dempsey gave no indication that one could construct a gas sensor without a reference electrode (or without a potentiostat), it wouldn't have been obvious to not utilize Dempsey without a reference electrode or a potentiostat. Hence, applicant is essentially arguing that the threshold for obviousness changes to Dempsey is what Dempsey explicitly suggested. However, the threshold for obviousness should not be what did Dempsey explicitly disclose or even suggest, but what would the prior art as a whole suggest to one possessing ordinary skill in the art. Regardless of how much of Dempsey's disclosure is drawn to how it

utilized its reference electrode does not alter the fact that one possessing ordinary skill in the art would have recognized that a reference electrode is not necessary for successful gas sensing.

67. Furthermore, the examiner is confused by the applicant's continued insistence that one of ordinary skill in the art could not have gone from a three-electrode embodiment like Dempsey to a two-electrode embodiment when applicant's own disclosure shows one can readily do so. In particular, applicant goes from a two-electrode embodiment having just sensing and counter electrodes in fig. 2 to a three-electrode embodiment having sensing, counter, and reference electrodes in fig. 11. There is absolutely no indication in the disclosure that the presence or absence of the reference electrode is critical to the operation of the sensor. The only comment the applicant appeared to make about this distinction between two and three-electrode sensors is that the two-electrode sensors would have provided a cost savings (col. 10, ll. 23-27).

68. With respect to the rejections relying on Tomantschger, applicant urges that Tomantschger is drawn to the use of electrodes having a hydrophobic binder, which would lead one of ordinary skill in the art away from the further teachings of Vanderborgh, Grot, and/or Uchida. However as discussed in detail above, both Vanderborgh and Uchida disclosed that its electrodes can contain Nafion and still possess high hydrophobic character. See also the examiner's discussion of Surampudi, Grot, and Cisar above as well. Furthermore, this whole line of argument for Tomantschger is even less relevant than it was for Dempsey because Tomantschger appears to be primarily interested in the use of hydrophobic binders as a means to prevent liquid electrolyte loss (col. 10, ll. 36-46). However, because Tomantschger also discloses that the electrolyte can be a solid polymer like Nafion (col. 6, ll. 61-63), applicant's

alleged criticality that the electrode of Tomantschger be hydrophobic is moot for the solid electrolyte embodiments of Tomantschger.

69. Applicant further urges that it is impermissible for the examiner to rely on the electrode and electrolyte dimensions of Dempsey for the sensor of Tomantschger because these two teachings are drawn to two different types of sensors. First, this is incorrect as Tomantschger teaches both two-electrode embodiments (fig. 3) as well as three-electrode embodiments like that of Dempsey (fig. 4). Tomantschger gives no indication that the electrode or electrolyte sizing for these sensors need be any different for the different types of sensors. Second, applicant's own claims appear to work against this line of argument. In particular, applicant claims the exact same electrode and electrolyte dimensions irrespective of whether the sensor is a two-electrode embodiment or a reference electrode containing embodiment. In particular, compare claim 108 (which depends from claim 82) to claim 70 (which depends from claim 59). Claim 82 is drawn to a two-electrode embodiment and claim 59 is drawn to a three-electrode embodiment (i.e. a reference electrode containing sensor). Because applicant is utilizing the exact same dimensions for both its two-electrode and three-electrode embodiments, then it is entirely unclear how applicant can then turn around and urge Dempsey's various dimensions would be irrelevant for Tomantschger. Applicant clearly demonstrates that dimensions for a three-electrode embodiment are precisely relevant for two-electrode embodiment as well.

70. With respect to the examiner's interpretation of the limitation "in the absence of an applied voltage to the sensing electrode" or "in the absence of any biasing voltage", applicant urges that Dempsey expressly teaches that its electrode would be poisoned with carbon monoxide in the absence of the applied voltage. This is unpersuasive for two reasons. First,

none of these claims require the actual gas being analyzed to be carbon monoxide, so these arguments are moot when the analyte is a gas such as alcohol or NO<sub>2</sub> (see Dempsey abstract). There is no indication that alcohol or NO<sub>2</sub> are known to poison the electrodes of Dempsey. Second, this argument ignores the fact that the examiner is not relying on the electrodes of Dempsey, but is relying on electrodes modified by the further teaching of Grot, Vanderborgh, and Uchida which included an ionically conducting material into its electrode. Because one of the primary arguments by the applicant was that the addition of the ionically conducting material to the electrode allowed the sensor to be operated without a bias or applied voltage (see Declaration of 9/22/2008, point 10 iii), if Grot, Vanderborgh, and Uchida render obvious the addition of ionically conducting material to the electrodes of Dempsey (as has been maintained throughout this prosecution), then the supposed poisoning that Dempsey saw with its electrodes not containing electrolyte would be irrelevant for the proposed modified electrodes.

71. Applicant's arguments concerning the further use of Tomantschger '274, LaConti, and Razaq appear to rely on the arguments about the perceived failings of the earlier rejections. Because those earlier arguments were unpersuasive as discussed above, these further arguments are similarly unpersuasive.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaj K Olsen/  
Primary Examiner, Art Unit 1795

April 21, 2010